

entrance ends of the fiber, said lens having a length at least as long as the array of light entrance ends, said cylindrical lens being attached directly to each of the light entrance ends by a bead of glue in a manner to center the lens on the light entrance ends to facilitate alignment independent of the holder.

20. A light source as recited in claim 19 wherein said cylindrical lens is an optical fiber.

21. A light source as recited in claim 19 wherein said optical fibers are multimode fibers.

REMARKS

In the parent application, the method claims were allowed, but the apparatus claims were rejected. In particular, in an amendment after final, the Examiner indicated that the amended apparatus claims raised new issues. Applicant is, therefore, resubmitting the apparatus claims in the form set forth in the response to the final action. The following remarks are taken from that response in the parent case.

The subject invention relates to a diodes laser module. The diode laser module of both the invention and the principal reference relied on by the Examiner in the parent case (d'Auria) have similar components. The first component is a semiconductor laser diode. The second component is one or more optical transport fibers with the entrance sides aligned with the emitter region of the laser diode. Light from the laser diode enters the transport fibers and is carried along the length thereof to an exit face of

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the fibers. Light exiting the fibers can be advantageously used to pump a laser gain medium. Use of the fibers allows the pump source (diode) to be physically separate from the gain medium.

The third significant component of the module is a cylindrical lens, positioned between the laser diode and the array of fibers, for increasing the amount of light coupled into the entrance faces of the optical fibers. The cylindrical lens, which in the preferred embodiment is also an optical fiber, functions to capture light rapidly diverging from the array and focus it into the array of optical fibers.

In the d'Auria structure, a base or substrate is provided onto which both the transport fiber 2 and the focusing lens 3 are mounted. More particularly, d'Auria teaches that it is necessary to accurately align the transport fiber on the substrate between dowels 51, 52 and 53. The transport fiber is placed onto the substrate and secured in place with adhesive. (See column 3, line 15+). Next, the fiber lens is mounted onto the substrate. Alignment is achieved using additional dowels 54 and 55. The focusing lens 3, like the transport fiber, is attached to the substrate with an adhesive (column 3 line 47+). d'Auria teaches that an "index matching" liquid can be added between the fiber and the lens to promote coupling (column 3, line 55+). As can be seen, in d'Auria, both the transport fiber and the lens are mounted to the substrate in a fixed relationship defined by the dowels and the substrate. d'Auria also notes that separate shims 32, 32 might also be needed to control the alignment (column 3, line 55+).

The arrangement described in d'Auria is complex and time consuming to assemble. The laser diode module of the subject invention provides a far better and simpler solution to the alignment problem.

As brought out more clearly in the amended apparatus claims, in the subject invention, only the transport fibers are mounted to a holder. The focusing lens, on the other hand, is glued directly to the light entrance sides of the fibers. The glue functions to automatically self-center and align the lens with the fibers without the need for attaching the lens to the support. (See applicant's Figure 6 where lens 22 is shown attached only to the fibers and not to support 50). This difference is significant because there is no need to separately align the lens with respect to the support.

In the Office Action in the parent case, the Examiner admitted that d'Auria failed to teach gluing the lens to the fibers but argued that such gluing would be obvious since the lens is glued to the substrate. Applicant strongly disagrees.

One skilled in the art reading d'Auria understands that alignment is achieved by mounting the lens to the substrate in a manner to abut the dowels. d'Auria provides no motivation whatsoever to add the step of gluing the lens to the entrance ends of the fiber to provide alignment. In fact, d'Auria teaches away from this concept since it discloses adding an index matching fluid between lens and fiber ends.

More importantly, even if the Examiner was correct and one skilled in the art would add glue between the lens and the fibers in d'Auria, the resulting structure would still not read on the

amended apparatus claims. More particularly, even if one skilled in the art were to glue the lens to the fibers in the d'Auria structure, the resulting structure would still include the lens, glued and aligned to the substrate with the dowels. There is no suggestion in d'Auria to omit the step of attaching the lens to the substrate. In contrast, applicant's amended apparatus claims now make clear that the lens is mounted to the fibers independent of the support. This provides a clear distinction over the d'Auria structure even as modified by the Examiner.

Another significant problem with the rejection in the parent case is that it relies on the Examiner's position that "it was well known in the art to glue a lens or lenses to an entrance side of an optical fiber." The Examiner, however, fails to provide any support for this supposed knowledge. Applicant is not aware of such a teaching and it is improper for the Examiner to maintain this position without offering some evidence to support it.

In the Office Action in the parent case, the Examiner also cited the patents to Comerford and Scrifes. Comerford, like d'Auria, illustrates a device wherein both the transport fibers and the lens are mounted on a substrate. Scrifes was cited for its teaching of using a laser diode module to pump a solid state gain medium. Neither the Comerford nor Scrifes references overcome the deficiencies of d'Auria in anticipating or rendering obvious applicant's invention.

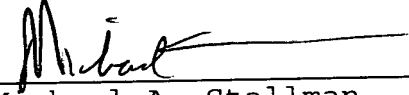
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Based on the above, it is respectfully submitted that the amended claims define patentable subject matter and early allowance is respectfully requested.

Respectfully submitted,
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